Volume 14 Job No. G-I-F

STATE OF ALASKA

William A. Egan, Governor

Annual Progress Report for

INVENTORY AND CATALOGING OF SPORT FISH AND SPORT FISH WATERS OF THE COPPER RIVER, PRINCE WILLIAM SOUND, AND THE UPPER SUSITNA RIVER.

by

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RESEARCH PROJECT SEGMENT

State: Alaska

Project No.: F-9-5 Name: Sport Fish Investigations in Alaska

Study No.: G-1 Study Title: Inventory and Cataloging

Job No.: G-1-F Job Title: Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River, Prince William Sound, and the Upper Susitna River.

Period Covered: July 1, 1972 to June 30, 1973.

ABSTRACT

Forty lakes, previously unsurveyed, were sampled with gillnets for fish population analysis.

Fifteen managed lakes were test netted to determine both the success and condition of experimentally stocked fish, and the status of native fish stocks.

Sampling of the grayling, Thymallus arcticus, population in Tolsona Lake from 1964 through 1972 indicates artificial stocking contributes significantly to the total number of that species.

A two-year fishery resource inventory of the Nellie Juan portion of Prince William Sound, in cooperation with the Commercial Fish Division and the United States Forest Service was completed in 1972.

Preliminary investigations of the Robe River system for potential rehabilitation and fishery enhancement was initiated in 1972.

Silver salmon, Oncorhynchus kisutch, surveys were conducted in the Port Valdez area. Scale sample analysis indicated that 90% of the fish were age 2.1.

Creel census was conducted during the Valdez silver salmon derby. The angler catch per hour of silver salmon was 0.14, the same as recorded in 1968.

Creel census of salmon fishermen at Eshamy Creek, located in Prince William Sound, indicated the sport catch of red salmon, O. nerka, increased from 151 in 1966 to 1,353 in 1972. The 1972 sport catch was 2.5% of the escapement.

The northern-most range of cutthroat trout, Salmo clarki clarki, in Prince William Sound, determined in 1972, is Latitude 61° 04' N.

Scale analysis of steelhead trout, S. gairdneri, from the Copper River, indicates the majority of these fish spend three years in fresh water before migrating to the ocean.

Chinook salmon, O. tshawytscha, surveys were conducted on eight streams in the Upper Copper River Basin. The 1972 estimated escapement of king salmon into the Upper Copper River of 14,953 is similar to the 13,224 escapement estimate for 1971.

Both a counting tower and an electronic fish counter were installed in the Gulkana River in 1972. The estimated total count of sockeye salmon and chinook salmon was 19,870 and 769 respectively.

Winter dissolved oxygen determinations were made on 32 lakes. Eight of 10 lakes checked had higher concentrations of dissolved oxygen in 1972 than in the same lakes in 1970 and 1971.

Twenty construction projects were investigated for possible losses of fish and fish habitat. Appropriate recommendations were made.

Investigations of the Gakona River drainage fisheries were conducted in 1972. The findings indicated that damage to fisheries resources would be less if the Trans-Alaska Pipeline was constructed in that drainage rather than the Gulkana River drainage.

RECOMMENDATIONS

1. Cataloging and inventory surveys should be continued with emphasis on the Prince William Sound area.
2. Continue the study of anadromous fish stocks in the area.
3. Experimental stocking of salmonids and other hatchery produced fish should be continued where conditions are deemed suitable, and follow-up surveys conducted to determine the success of these experimental introductions.
4. Continue rehabilitation of suitable lakes and the establishment of sport fisheries where practical.

5. Continue the monitoring of pipeline preconstruction, road and bridge construction and other land uses to afford maximum protection to the fishery resources and habitat.
6. Continue studies of this fisheries resources in the Gakona River drainage. Construction of a pipeline in the Gakona River drainage would cause considerably less environmental and fishery resource damage than one constructed within the Gulkana River drainage.

OBJECTIVES

1. To determine the environmental characteristics of the existing and potential recreational fishing waters of the job area, and where practical, obtain estimates of the sport fish harvest and angler participation rates.
2. To assist in determining the current status of public access to the recreational fishing waters within the job area, and to make recommendations for selection of recreational fishing access sites.
3. To evaluate multiple water-use development projects (public and private) and the effects on the areas' streams and lakes.
4. To determine stocking measures and to formulate recommendations for the management of area waters and direct the course of future studies.
5. To determine the magnitude of anadromous fish stocks and develop plans for their enhancement with emphasis on sockeye chinook salmon.

TECHNIQUES USED

Standard techniques as described by Williams (1971) were used in lake and stream surveys, water sample analysis, and net and seine fish samples.

Salmon counts at the Gulkana River site were made for 15 minutes during each hour, for each side of the river. When fish counts were made from only one side of the river. When fish counts were made from only one side of the river, they were made for 20 minutes of each hour. Counts made each day were expanded for the 24-hour period.

FINDINGS

Population Sampling - New Lakes

During 1972 a total of 40 previously unsurveyed lakes were test netted to determine species of fish present and relative abundance. This data is presented in Tables 1 and 2.

Twenty-nine of the new lakes surveyed are located in the Upper Copper River and Upper Susitna River drainages, and 11 in the Prince William Sound and Lower Copper River drainages. Physical and biological data is presented in Tables 3 and 4.

Table 1 Test Gillnet Summaries, New Lakes, 1972. Upper Copper River and Upper Susitna River Drainage.

Name	Location	No. of Fish	* Species	Length Range (mm)	Mean Length (mm)	** Frequency	Percent Compostion
Bob's	T5N R7W S18	26	WF	235-445	266	0.50	51
		18	GR	170-318	241	0.30	35
		3	SK	340-460	380	0.05	6
		2	BB	480-545	512	0.03	4
		2	KOK	220-225	222	0.03	4
Brown	T4N R7W S26	No Fish					
Bufflehead	T4N R7W S26	30	GR	120-330	267	1.25	94
		2	SK		335	0.08	6
Canyon	T11N R2W S27	292	GR	105-305	210	6.63	98
		6	SK	408-445	427	0.01	2
Chaix	T2N R3W S6	33	SK	150-430	300	1.40	57
		24	GR	190-340	260	1.00	41
		1	BB	600	600	0.04	2
Clear	T4S R7W S28	2	DV	440-520	480	0.05	100
Double Cabin	T10W R2E S22	No Fish					
DuRelle	T1S R1W S27	No Fish					
Durham	T3N R4W S30	78	GR	160-340	250	3.20	67
		38	SK	130-370	350	1.60	33
Femur	T7N R6W S28	43	WF	220-280	247	1.07	83
		9	SK	440-495	465	0.22	17

Table 1 (con'd)

Name	Location	No. of Fish	* Species	Length Range (mm)	Mean Length (mm)	** Frequency	Percent Compostion
Gale	T8N R7W S10	82	WF	110-290	240	3.40	94
		2	LT	720-730	725	.08	4
		3	SK	115-400	155	.12	2
Haggard	T11N R1W S30	26	GR	150-360	331	1.10	100
Kelly	T4N R10W S2	72	WF	190-355	280	1.56	67
		35	GR	175-360	297	.76	33
Knob	T11N R2E S33	6	WF	220-250	230	.30	75
		2	SK			.10	25
Leon	T5N R7W S19	63	WF	115-370	220	1.21	69
		21	SK	100-423	250	.04	23
		7	GR	113-235	171	.01	8
Loon	T4N R7W S35	No Fish					
Marie	T5N R9W S31	34	WF	180-260	232	.74	79
		9	SK			.19	21
Mick	T8N R7W S10	10	WF	190-280	220	.40	100
Nickel	T1N R4W S10	62	GR	120-320	250	1.30	77
		19	SK	140-520	400	.40	23
Rocky	T4N R6W S23	No Fish					
Spring Creek	T12N R1W S4	30	GR	110-410	350	.62	100

Table 1 (con'd)

Name	Location	No. of Fish	* Species	Length Range (mm)	Mean Length (mm)	** Frequency	Percent Compostion
Sue	T6N R7W S24	28	GR	120-275	243	.58	42
		23	WF	205-430	248	.46	33
		16	SK	220-420	395	.33	25
Tolsona Mt.	T4N R5W S6	No Fish					
Little Tolsona Mt.	T4N R5W S8	No Fish					
Tower I	T4N R5W S17	No Fish					
Tower II	T4N R5W S17	No Fish					
Three Finger	T6N R7W S35	No Fish					
Willy	T4N R7W S26	15	SK	297-480	354	.60	100
Whitefish	T10N R2E S2	36	WF	220-460	305	1.00	90
		3	SK			.08	10

* WF - Whitefish, GR - Grayling, SK - Sucker, BB - Burbot, KOK - Kokanee, DB - Dolly Varden, LT - Lake Trout.

** Frequency is the number of fish per net hour.

Table 2 Test-Gillnet Summaries, New Lakes, 1972. Lower Copper River and Prince William Sound Drainages.

Name	Locations	No. of Fish	* Species	Length Range (mm)	Mean Length (mm)	** Frequency	Percent Composition
Cascade (Lower)	T10N R9E S34	No fish	----	----	----	----	----
Cascade (Middle)	T10N R9E S34	No fish	----	----	----	----	----
Cascade (Upper)	T10N R9F S28	No fish	----	----	----	----	----
Chuck's	T10S R10W S23	61	DV	75-230	165	1.01	56
		48	CT	125-365	195	0.80	44
Cochrane	T8N R6E S21	1	DV	273	273	0.05	100
Devish	T9S R9W S34	15	CT	100-205	168	0.31	58
		11	DV	170-205	195	0.23	42
Silver	T11S R7W S4,5,6	1	DV	400	400	0.016	100
Surprise	T8N R6E S28	No Fish	----	----	----	----	----
Winner ***	T10S R10W S14	3	CT	150-255	220	----	60
		2	RT	330-355	340	----	40
La Rae ***	T10S R10W S24	3	CT	230-350	278	----	100
Tsaina	T8S R3W S1	39	DV	126-344	264	1.80	100

* DV - Dolly Varden CT - Cutthroat RT - Rainbow Trout

** Frequency is the number of fish per net hour.

*** Sampled by hook and line for one hour.

Table 3 Physical and Biological Data From New Lakes Surveyed in the Upper Copper and Upper Susitna River Drainages, 1972.

Lake	Surface Area Acres	Maximum Depth (ft)	% of Shoal Area	Fish Species Present *	Sub-Drainage
Bob's	150	25	20	WF,GR,SK,BB,KOK	Mendeltna Creek
Brown	10	25	20	----------	Mendeltna Creek
Bufflehead	18	32	20	GR,SK	Mendeltna Creek
Canyon	130	17	80	GR,SK	Gulkana River
Chaix	130	15	100	BB,SK,GR	Mickel Creek
Clear	280	95	12	DV	Kuskulana River
Double Cabin	230	12	100	----------	Gakona River
DuRelle	160	56	----	----------	Squirrel Creek
Durham	230	15	100	GR,SK	Durham Creek
Femur	175	20	75	WF,GR,SK	Tolsona Creek
Gale	420	35	40	WF,LT,SK	Tyone River
Haggard	160	13	100	GR	Haggard Creek
Kelly	90	50	15	GR,WF	Little Nelchina River.
Knob	92	18	70	WF,SK	Gakona River
Leon	140	35	---	WF,GR,SK	Mendeltna Creek
Loon	9	15	100	----------	Woods Creek
Marie	210	37	30	WF,SK	Little Nelchina River
Mick	170	30	25	WF	Tyone River
Nickel	180	35	25	GR,SK	Mickel Creek
Rocky	30	12	100	----------	----------
Spring Creek	175	25	50	GR	Spring Creek
Sue	150	30	30	GR,WF, SK	Tolsona Creek
Three Fingers	50	17	90	----------	Tolsona Creek
Tolsona Mountain	75	25	45	----------	Tolsona Creek
Little Tolsona Mountain	25	10	100	----------	Mae West Creek
Tower I	5	17	90	----------	No Drainage
Tower II	10	18	90	----------	No Drainage
Willy	8	32	20	SK	Woods Creek
Whitefish	345	35	60	WF,SK	Gakona River

* SK - Sucker WF - Whitefish KOK - Kokanee LT - Lake Trout
GR - Grayling BB - Burbot DV - Dolly Varden

Table 4 Physical and Biological Data From New Lakes Surveyed in the Lower Copper River and Prince William Sound Drainages, 1972.

Lake	Surface Area Acres	Maximun Depth (ft)	% of Shoal Area	Fish Species Present *	Location by Bay or Drainage
Cascade (Lower)	170	137	10	none	Eaglek Bay
Cascade (Middle)	70	105	5	none	Eaglek Bay
Cascade (Upper)	275	227	5	none	Eaglek Bay
Chuck's	110	55	15	DV,CT	Columbia Bay
Cochrane	65	70	5	DV	Cochrane Bay
Devish	12	48	20	DV,CT	Sawmill Bay
La Rae	60	---	---	DV,CT	Columbia Bay
Silver	950	85	5	DV	Galena Bay
Winner	25	---	---	RS,SS,DV,CT,RT	Columbia Bay
Surprise	100	110	15	DV	Cochrane Bay
Tsaina	100	105	5	DV	Tsaina River

* DV - Dolly Varden CT - Cutthroat RT - Rainbow Trout SS - Silver Salmon RS - Red Salmon

Test Netting, Managed Lakes

During 1972, 15 managed lakes were test netted to determine the results and progress of experimentally stocked fish and changes in the status of natural stocks (Tables 5 and 6).

Buffalo and Harvey lakes were stocked with rainbow trout, Salmo gairdneri, in 1971. Trout taken from Buffalo Lake in 1972 had an average fork length of 234 mm after 11 months in the lake. No fish were taken from Harvey Lake due to an apparent winter kill. The minimum dissolved oxygen concentration during the previous winter was 1.5 ppm (Table 7). Failure to catch grayling, Thymallus arcticus, while test netting Arizona Lake indicates the winter kill during 1970-1971 was complete.

Elbow and Caribou lakes were treated with rotenone in 1971. Test netting in 1972 caught no fish and indicates a successful treatment. Caged fish were put in these lakes to check the toxicity. Elbow Lake was still toxic and will be checked again in 1973 before stocking. Caribou Lake was subsequently stocked with rainbow trout.

Moose Lake experienced a near complete winter kill in 1970-1971 when the dissolved oxygen concentration was recorded as a trace. In 1972, a total of 100 suckers, Catostomus catostomus, and two grayling were taken with gillnets. These fish may have moved into Moose Lake from Tolsona Lake via Bessie Creek during their spawning migration.

Lindy Lake was stocked in 1969 with rainbow trout, but none were taken during test netting in 1970 and 1972, and the experimental plant was an apparent failure.

Van Lake was stocked in June, 1971, with rainbow trout fry. Test netting in June, 1972, caught rainbow trout ranging in fork length from 150 to 240 mm. Fish Lake (West Fork Gulkana River) was test netted in 1965 and again 1972. The mean length of whitefish, Prosopium cylindraceum, and Coregonus pidschian, taken in 1965, was 277 mm fork length and in 1972 it was 280 mm fork length. A limited commercial whitefish fishery has been conducted on this lake since 1964.

Figure 1 shows the frequency of gillnet-captured grayling from Tolsona Lake from 1964 through 1972, and the percent of Age I grayling in the samples. The 1972 frequency of 2.1 grayling per net hour is a slight increase over 1971, when it was 1.66. The net frequency for grayling peaked in 1966 at 4.27 and dropped to a low of 0.14 in 1967.

Grayling egg-take operations were conducted at the Tolsona Lake inlet in 1965, 1966, 1967, and 1972. From 1968 to 1971, low levels of precipitation prevailed and the inlet stream, Bessie Creek, was either dry or extremely low. This stream serves as the primary spawning area for grayling.

Table 5 Test Gillnet Summaries, Managed Lakes, Upper Susitna and Upper Copper River Drainages, 1972.

Name	Location	No. of Fish	* Species	Length Range (mm)	Mean Length (mm)	Unit Effort	Percent Composition
Arizona	T8N R7W S24	No Fish	---	---	---	---	---
Buffalo	T3N R7W S2	6	RT	210-267	234	0.12	100
Caribou	T5N R7W S16N½	No Fish	---	---	---	---	---
Crater (Lk. Louise)	T4N R6W S29 NW½	2	RT	410-490	450	0.05	100
Elbow	T5N R7W S22	No Fish		---	---	---	---
Fish	T9N R3W S18	45	WF	125-355	280	1.90	81
		10	SK	---	---	0.40	19
Harvey	T3N R7W S1	No Fish	---	---	---	---	---
Lindy	T4N R7W S25	29	SK	155-485	375	0.60	100
Moose	T4N R5W S13	100	SK	---	---	2.0	98
(Glenn HWY)	----	2	GR	210-300	255	0.04	2
Sarani	T6N R7W S34	29	WF	215-400	215	0.04	77
	----	8	GR	118-246	182	---	21
	----	1	SK	170	170	---	2
Tolsona	T4W R5W S24	79	GR	100-450	295	2.1	89
	----	10	SK	310-450	365	0.25	11
Van	T4S R7E S21	45	RT	150-240	194	2.31	98
	----	1	DV	---	625	0.05	2

* RT - Rainbow Trout, WF - Whitefish, SK - Suckers, GR - Grayling, DV - Dolly Varden.

** Frequency is the number of fish per net hour.

Table 6 Test Gillnet Summaries, Managed Lakes, Lower Copper River and Prince William Sound Drainages, 1972.

Name	Location	No. of Fish	* Species	Length Range (mm)	Mean Length (mm)	** Frequency	Percent Composition
Blueberry	T9S R3W S2	1	RT	150	150	0.04	100
Thompson	T8S R3W S26	3	RT	160-190	180	0.12	100
Worthington	T8S R3W S26	6	RT	160-472	226	0.25	100

* RT - Rainbow Trout

** Frequency is the number of fish per net hour.

Table 7 Winter Dissolved Oxygen Determinations, Glennallen Area, 1972.

Date	Lake	Snow (inches)	Ice (inches)	Depth of Sample (ft)	PPM Oxygen
Feb. 4	Blueberry	15	42	5	8.5
March 2	Whale	12	27	5	9.5
March 2	Marty	14	27	5	9.5
March 2	Paddle	14	26	5	10.5
March 2	Kusklana	14	25	5	6.0
April 4	Moose	8	28	5	2.5
April 4	Tolsona	10	29	5	3.0
April 7	Elbow	24	18	5	9.5
April 7	Forgotten	12	31	5	4.5
April 7	Crater	12	26	5	8.5
April 7	Junction	18	24	5	5.0
April 7	Buffalo	24	18	5	9.5
April 7	Popeye	15	26	5	1.5
April 7	Tex Smith	15	24	5	5.5
April 11	Mae West	14	28	5	3.5
April 11	Mirror	14	27	5	8.5
April 17	Dick	16	40	5	9.0
April 17	Miers	16	33	5	8.5
April 17	Nita	18	30	5	8.5
April 17	Muskrat	18	21	5	Trace
April 17	Gakona Pit	16	36	5	6.0
April 18	Mosquito	10	30	5	3.0
April 18	One Mile	10	32	5	.0
April 18	Two Mile	10	32	5	6.0
April 18	Three Mile	0	50	5	2.5
April 19	George	14	32	5	.0
April 19	Caribou	21	24	5	7.0
April 19	Purnt	14	31	5	9.0
April 19	Harvey	24	20	5	1.5
April 20	Gergie	15	26	5	2.5
April 20	Arizona	14	27	5	5.0
April 20	Mile 159	10	29	5	3.0

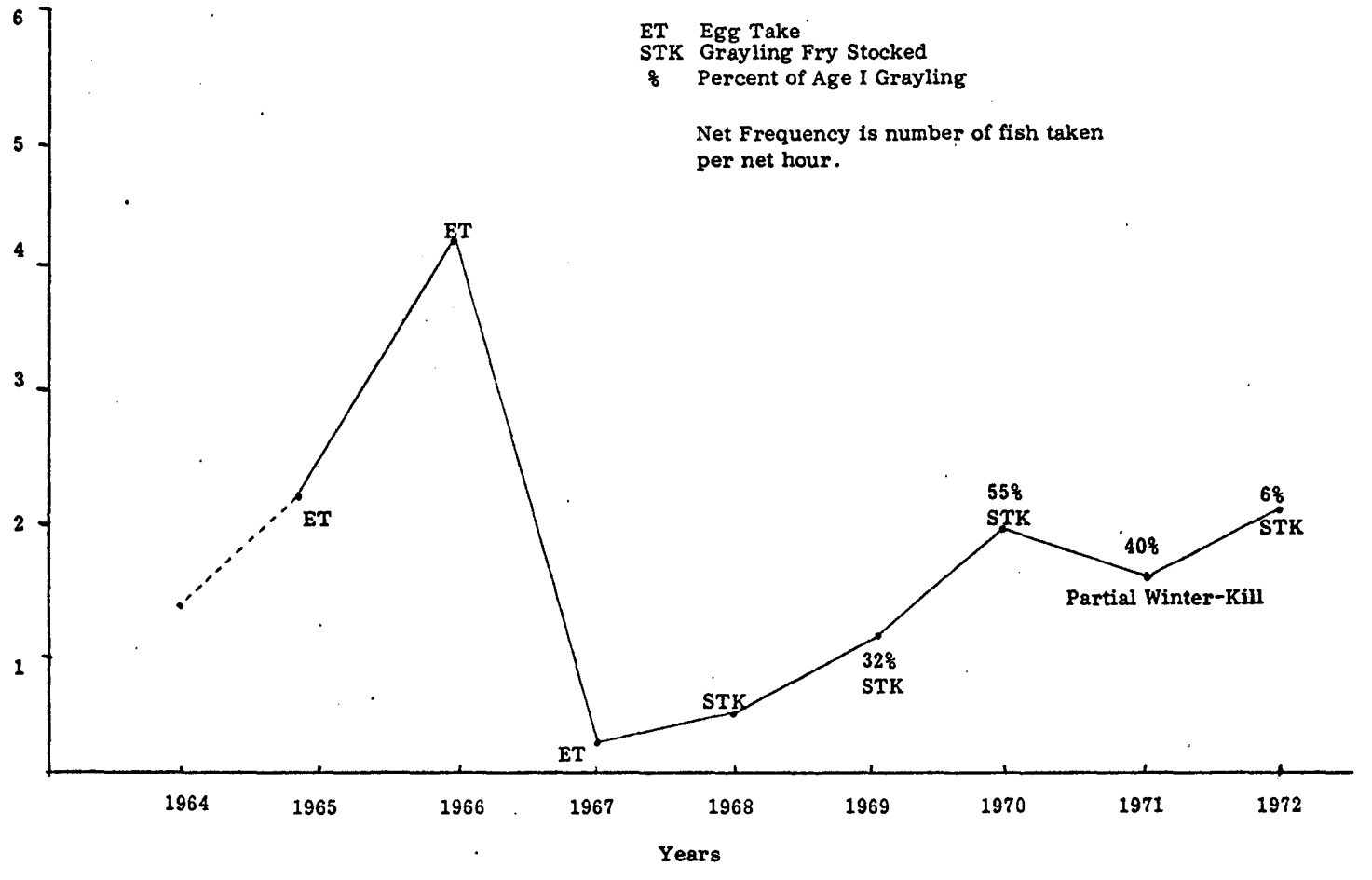

Figure 1 Net Frequency and Percent of Age I Grayling Taken By Test Netting Tolsona Lake. 1964 - 1972

A stocking program was initiated in 1968 and fry-size grayling have been introduced into the lake every year since, except in 1971, when no fish were available. In 1972 the percent of Age I grayling in the test net sample dropped to 6% from a previous high of 55%. This tends to indicate poor natural reproduction and the value of the stocking program in maintaining the grayling population.

Thompson, Blueberry, and Worthington lakes are located on Thompson Pass adjacent to the Richardson Highway. Thompson Lake is only nine feet deep but has maintained a better than average rainbow trout fishery for many years. In 1972, test-netting frequency for rainbow trout dropped to 0.25 from a previous high of 3.75 fish per hour in 1969. (During test netting dead rainbow trout were observed.)

Blueberry and Worthington lakes have been stocked on a regular schedule with rainbow trout since at least 1958. In 1972 the net frequencies for rainbow trout were 0.04 and 0.25 respectively.

Winter Dissolved Oxygen Determinations

Winter dissolved oxygen determinations were conducted on 32 lakes in the area during 1972. This information is shown in Table 7. A complete winter kill of rainbow trout occurred in Harvey Lake when the dissolved oxygen concentration dropped to 1.5 ppm. This was the only lake checked in 1972 that incurred a winter kill.

Table 8 compares dissolved oxygen levels in selected lakes for 1970, 1971, and 1972. During the winter of 1971 - 1972 the snow pack in the area was greater than normal, yet eight of the lakes had higher concentrations of dissolved oxygen than in the two previous winters.

Nellie Juan Study Area

In 1971 a resource inventory of the Nellie Juan portion of Prince William Sound was initiated. This area, which encompasses the eastern most portion of the Kenai Peninsula mainland from Point Decision south to Cape Puget, is under consideration by the United States Forest Service as a wilderness area. The resource inventory, completed in 1972, was conducted by the United States Forest Service and the Sport Fish and Commercial Fish divisions of the Alaska Department of Fish and Game.

The Nellie Juan area is characterized by numerous glaciers and precipitous terrain. The soils are thin and basic nutrients are notably lacking. Alpine conditions are encountered above 1,000 feet elevation. The climate is generally cool with wet summers and mild winters, with heavy snow accumulation.

Table 8 Comparison of Dissolved Oxygen Concentrations on Selected Lakes, Glennallen Area, 1970, 1971, 1972.

Lake	Dissolved Oxygen in PPM * 1970	1971	1972
Arizona	4.0	.5	5.0
Caribou	6.5	5.0	7.0
Crater	6.0	6.0	8.5
Dick	9.5	11.0	9.0
Elbow	6.5	5.0	9.5
Junction	5.5	5.5	5.0
Mirror	6.5	5.5	8.5
Moose	1.5	.0	2.5
Nita	6.0	6.0	8.5
Tolsona	1.8	.0	3.0

* All tests conducted in April and at depth of five feet.

Commercial fishing is the primary economy and attraction to the area at present. The marine environment is very productive and is inhabited by many species of bottom fish, shellfish, and salmon, some of which are relatively unexploited.

There are two general types of freshwater lake environments in the Nellie Juan study area. Many of the lakes in this area are inaccessible to anadromous fish species because of barriers in the outlet streams. These lakes are characterized by steep shorelines, lack of shoal areas, acidic water and high water exchange rates. Fish populations, if any, are generally composed of small Dolly Varden, Salvelinus malma, which are often stunted. These lakes are rarely fished and do not offer a high quality of fishing.

The other type of lakes are those accessible to salmon for spawning purposes. These lakes are usually within a mile of the marine environment and are more productive because of the nutrients derived from salmon carcasses. These lakes are the primary producers of sockeye salmon, Oncorhynchus nerka, and coho salmon, O. kisutch.

During 1971 and 1972, twelve lakes in the Nellie Juan study area were surveyed, seven of which had outlet barriers to upstream migration of fish. Three of these lakes were barren of fish and the remaining four had populations of resident Dolly Varden.

The five lakes without outlet barriers contain populations of pink salmon, O. gorbuscha, red salmon, silver salmon, Dolly Varden, and cutthroat trout, Salmo clarki clarki.

One hundred streams in the Nellie Juan study area were surveyed for flows, temperatures, and other physical data. The streams in this area are generally small (less than 25 feet wide) and short (one to four miles in length), with flows that fluctuate greatly with daily precipitation. Summer water temperatures seldom excel 50° Farenheit. Pink salmon and chum salmon, O. keta, utilize most of these streams successfully for spawning. These are the most abundant species of salmon found in the Nellie Juan area and the majority of commercial fishing effort is directed toward them.

Eshamy Lake System

Sport fishing effort in the Nellie Juan area is relatively low and most of the pressure is on the Eshamy Lake and stream system.

Eshamy Lake is located on the mainland between Port Nellie Juan and Knight Island Passage in Prince William Sound. The lake is fed by several small streams

and drained by Eshamy River into Eshamy lagoon, a distance of about one quarter mile. Fish species found in this system include cutthroat trout, Dolly Varden, sockeye salmon, coho salmon, pink salmon, chum salmon and chinook salmon, O. tshawytscha.

Limited sport fishing has occurred in the Eshamy system for many years. Salmon fishermen concentrate on Eshamy lagoon while trout anglers utilize the upper section of the river and the lake. Sport catch data are shown in Table 9. A few pink, chum, and silver salmon are taken in addition to the red salmon. The 1972 sport fish catch of red salmon was 2.5% of the escapement and 1.6% of the total run.

Weir counts of red salmon taken at Eshamy Creek from 1950 through 1972 varied from 1,437 to 108,963 and averaged 33,001 fish. Commercial catch records from 1950 through 1972 varied from 6,185 to 75,355 red salmon and averaged 33,067.

Port Valdez Stream Surveys

Because of need for data concerning management of salmon and the impending construction of the Trans-Alaska Pipeline, stream surveys to determine timing and abundance of anadromous fish species were initiated. The only previous escapement figures were recorded in 1970 and 1971 (Mattson, National Marine Fisheries Service).

Stream survey effort was concentrated on the Lowe River system, the Robe River system, Mineral Creek, and several small streams between Glacier Stream and Valdez city proper. Table 10 presents a summary of these surveys.

Timing of Runs:

Silver salmon first appeared in the lower portions of the Robe River in fresh water during mid-August. They were not observed in the other streams until mid-September. Red salmon enter the Robe Lake system in early June and spawn throughout the summer.

Chum salmon migration appeared to peak at the beginning of September; however, late runs were observed in Salmon Slough, City Limits Creek, and Mineral Creek until the end of October.

The pink salmon return was very low as predicted by the Commercial Fish Division. Three streams - Salmon Slough, Pit Creek, and the Robe River - had no return of pink salmon, although the combined escapement for these streams was 20,000 in 1971. The harsh winter of 1970-1971 was the apparent cause of the low return and may have affected other species of salmon present in the streams that year.

Table 9 Red Salmon Catch and Escapement From Eshamy System, 1966-1972.

Year	Creel Census Period	Anglers	Sport Catch No. of fish	% of Escapement	Escapement	Commercial Catch
1966	7/1 - 9/5	---	151	0.8	26,593	20,0826
1968	6/30-8/27	---	316	0.6	68,048	season closed
1969	6/26-9/11	---	452	0.7	61,196	61,728
1970	6/25-9/1	---	448	3.7	11,460	17,292
1971	7/12-9/5	---	301	9.0	3,000*	season closed
1972	7/1 -9/10	389	1353	2.5	28,750	52,903

* Estimated

Table 10 Estimated Salmon Escapement for Selected Lowe River Valley and Port Valdez Streams, 1972.

Stream	Maximum Count			Estimated Minimum		
	SS*	PS	CS	SS	PS	CS
17 Mile	211	0	0	300	0	0
10 Mile	8	0	0	40	0	0
8 Mile Seep	195	0	207	200	0	250
Salmon Slough	1500	0	1800	1800	0	3000
Pit Creek	23	0	19	25	0	25
Robe River and Robe Lake	875	0	40	3000**	0	200
Loop Road #1	0	475	45	0	600	100
Loop Road # 2	0	3	0	0	10	0
Siwash	41	161	162	50	250	250
City Limits	0	46	1200	0	50	2500
Mineral Creek	14	320	487	30	500	1000
Total				5,445	1,410	7,325

* SS - Silver Salmon PS - Pink Salmon CS - Chum Salmon

** Includes a count of 1706 for Corbin Creek, a tributary of Robe Lake. Actual estimates are 2000 for Corbin Creek and 1000 for Robe River.

Silver Salmon Length and Age Studies:

Silver salmon carcasses were randomly collected from three streams tributary to Port Valdez. Fifty fish were selected from 17-Mile Creek, 45 from 8-Mile Seep, and 29 from Salmon Slough. The fish were sexed, measured, and aged by the otolith method. Table 11 summarized this information. The percent of the otoliths collected could not be read. Ninety percent were read as Age 2.1 and 10% as Age 1.1 and 3.1.

Robe Lake Investigations:

Investigations of the Robe Lake system were initiated in 1972 to determine the limiting factors of salmon production and the feasibility of an enhancement program.

The Robe Lake system is a tributary to Valdez Arm located near the City of Valdez. The system is composed of Robe Lake, Robe River, and several small tributaries. The largest of these tributaries, Corbin Creek, has been blocked from the Robe Lake system by a dike which diverts the flow into Glacier Stream. A portion of Corbin Creek seeps through the dike and flows into Robe Lake.

Robe Lake has a surface area of 600 acres and a maximum depth of 15 feet; however, most of the lake is less than eight feet in depth. The lake has a dense growth of potamogeton which by late summer covers almost all of the lake surface. A temperature profile taken on August 14, 1972, showed the water temperature to be 70° Fahrenheit from the surface to the maximum depth of 15 feet. Dissolved oxygen determinations taken in February 1973 showed that many areas of the lake had only 1 ppm.

Silver salmon enter the Robe Lake system during mid-August and in 1972, 2,000 of these fish utilized Corbin Creek for spawning. In 1972, red salmon were entering the lake on June 5 when there was still two-thirds ice cover. The inmigration peaked in early July and an estimated 5,000 red salmon were schooled in the lake on July 28. Three of the inlets and portions of the lake were utilized for spawning. The spawning period is quite prolonged; live red salmon were still present in late September.

An anadromous population of threespine stickleback, Gasterosteus aculeatus, enter the lake in May to spawn. The young migrate out of the lake in August. In addition, the lake supports a freshwater population of stickleback. A minnow trap, operated for 48 hours in February, caught 121 stickleback. Resident and anadromous Dolly Varden are also present in the system.

Valdez Silver Salmon Derby

The Valdez Silver Salmon Derby began August 12, 1972 and continued through September 4, 1972. The number of registered participants was down slightly from 1971. This may have been a result of good sport catches of silver salmon

Table 11 Length Range and Mean Fork Length in Millimeters of Adult Silver Salmon in Three Lowe River Tributaries.

	17-Mile Creek	8 Mile Seep	Salmon Slough	Total
Total measured	50	45	29	124
Number of Females	22	24	15	61
Number of Males	28	21	14	63
Length Range of Females	640-780mm	660-750mm	585-730mm	
Length Range of Males	535-800mm	540-800mm	565-770mm	
Mean Fork Length of Females	708	702	687	700
Mean Fork Length of Males	672	672	685	675

Table 12 Daily Tower Counts for Gulkana River, 1972.

Date	June Red Salmon	June King Salmon	July Red Salmon	July King Salmon	August Red Salmon	August King Salmon
1	---	---	0	0	153	*
2	---	---	66	0	135	
3	---	---	123	0	34	
4	---	---	618	0	0	
5	---	---	2322	18	10	
6	---	---	1848	12	15	
7	---	---	3078	48	10	
8	---	---	488	32	0	
9	---	---	594	79	0	
10	---	---	48	16	247	
11	---	---	332	30	100	
12	---	---	552	48	6	
13	---	---	314	9	0	
14	---	---	0	19	0	
15	---	---	0	0	28	
16	---	---	0	0	266	
17	---	---	30	0	211	
18	---	---	19	13	30	
19	---	---	55	21	17	
20	---	---	809	82	0	
21	Counts start		312	72	1262	
22	0	0	199	27		
23	0	0	391	66		
24	1310	0	120	72		
25	1695	0	0	0		
26	1901	0	288	0		
27	711	0	0	59		
28	5	0	0	0		
29	12	0	0	0		
30	48	0	104	23		
31	---		207	14		
Totals	5,682		12,917	760		

Red Salmon 19861
King Salmon 760

* King salmon spawning in the count area precluded further counts of this species.

made in late July and early August prior to the derby.

A limited creel census was conducted at the small boat harbor during the week-end of August 12-13 and 27-28. One hundred and eighty-four anglers checked fished 1,000 hours for a catch of 135 silver salmon, 83 pink salmon, 14 chum salmon and one king salmon. The anglers averaged 0.14 silver salmon and 0.08 pink salmon per hour as compared to 0.28 and 0.50 silver and pink salmon, respectively, in 1971.

The catch per hour of both silver and pink salmon was down considerably from 1971. The silver salmon catch of 0.14 fish per hour was exactly the same as recorded in 1968 (Williams, 1969), which was the parent stock for returning salmon in 1972.

Scales from 51 silver salmon were collected during the creel census period and aged. Sixty-four percent were Age 2.1, 30% were Age 1.1, and 6% were Age 3.1.

Gulkana River

In 1972, counting towers and an electronic fish counter were installed on the Gulkana River approximately midway between the West and Middle Forks. The counting towers were manned from June 22 through August 20. Shortly after the electronic counter was installed, the water level dropped and it became ineffective. It will be moved to a new site in 1973.

Daily tower counts are shown in Table 12. The estimated total counts of red salmon and king salmon were 19861 and 760, respectively. On 24 of the 60 days that the counting towers were manned, enumeration of fish was limited or impossible because of high water and adverse weather conditions. The 1972 run-off in the Gulkana River system was greater than normal and adversely affected visibility.

Personnel at the counting tower recorded the number of sport fishermen using the river. One hundred and fourteen people were counted floating the river. In addition, other fishing parties came to the area by aircraft and ATV's. Since the counting tower was manned approximately 16% of the day, the actual number of fishermen was much greater than the count.

Cutthroat Trout in Prince William Sound

During lake and stream investigations conducted in Prince William Sound, data on the distribution of cutthroat trout was collected. The most northern location where cutthroat trout were found was at latitude 61° 04' N. Cowpen Lake in Unakwik Inlet and Devish Lake in Sawmill Bay are at this latitude and contain populations of cutthroat trout.

Cutthroat trout, taken from Chuck's and LaRae lakes, were aged by the otolith method and very slow growth was indicated. Trout ranging from Age V to

Age VIII were 230 to 350 mm in fork length. Both populations of cutthroat trout are non-anadromous.

Steelhead Trout

Fifteen steelhead trout, taken from fish wheels on the Copper River near Copper Center in September, 1972, were measured and aged by scale analysis. The fish ranged in length from 505 to 760 mm fork length (Table 13). Nine of the steelhead trout were age 3.2 and the remainder Age 2.3, 4.2, and 2.2. One of the fish was returning to freshwater for the second time.

King Salmon

King salmon escapement surveys were conducted on selected streams in the Upper Copper River Basin during 1972. The 1971 and 1972 escapement figures are shown in Table 14.

The number of king salmon counted in the Gulkana River in 1972 was almost twice the amount enumerated in 1971, the highest ever recorded.

During 1972 the Commercial Fish Division conducted tag and recovery studies of king salmon in Woods Canyon on the Copper River. The estimated escapement of king salmon was 14,953 and is very similar to the 1971 escapement of 13,224. The escapement estimates includes the subsistence catch (1,500) and the sport catch (1,000 - 1,500).

The estimated sport catch of king salmon from the upper Copper River drainage was similar to 1971. The majority of the catch came from the Gulkana and Klutina Rivers.

Scale samples and length data were collected from 33 king salmon caught by sport fishermen from the Gulkana River. The fish ranged from 770 to 1,160 mm in fork length and averaged 1,026 mm. Eighty-one percent of the fish were Age 1.3, 16% -Age 1.4, and 3%-Age 1.2.

Trans-Alaska Pipeline Investigations

During 1972 the Sport Fish Division continued to furnish biological data to the Interagency Fish and Wildlife team. This group of state and federal agency biologists are responsible for determining the effects of the proposed North Slope-Valdez Pipeline on fish and game resources.

The Gakona River drainage has been suggested as an alternate for the Gulkana River route for the proposed pipeline.

Table 13 Length, Age, and Sex of Steelhead Trout from the Copper River, 1972.

(mm) Length	Sex	Age *
540	F	3.2
750	F	2.3
680	F	3.2
720	F	3.2
660	F	-.2
700	F	3.2
660	F	3.2
690	F	3.2
715	F	4.2
760	M	3.2
695	M	2.3
610	M	3.2
690	M	3.2
505	M	2.2
640	M	3.1+S+1 **

* The first number is the years spent in freshwater and the second number is the years spent in salt water.

** Indicates one spawning check and a second trip back to fresh water.

Table 14 King Salmon Aerial Surveys, Copper River Drainage 1971-1972.

Stream	Maximum Count 1971	1972
Gulkana River	584	1011
Middle Fork Gulkana River	175	196
Indian River	200	71 **
East Fork Chistochina River	512	348
Grayling Creek	45	47
St. Anne Creek	4	25
Kinana Creek	81	89
Mendeltna Creek	56	49

* Aircraft counts made by Sport Fish and Commercial Fish personnel using a 150 Piper Super Cub.

** 1972 count incomplete due to muddy water.

The Gakona River originates at Gakona Glacier and flows in a southerly direction approximately 85 miles to the village of Gakona, where it joins the Copper River. The Gakona River carries a heavy silt load from the glacier, but has numerous, small tributaries that are clear. These small streams support grayling populations. The Gakona River drainage is characterized by many shallow lakes incapable of over-wintering game fish. Aerial and ground surveys were conducted in 1972 and four lakes were selected for test-netting. Knob and Whitefish Lakes have populations of whitefish and suckers (Table 1). Double Cabin Lake is barren. The Spring Creek Lake grayling ranged in fork length from 110 to 410 mm and averaged 350 mm.

As a result of work in 1972 and in the past, it has been determined there are only three known lakes, Gillespie, Meiers, and Spring Creek, supporting good grayling populations.

The predominant species of fish in the Gakona River drainage is whitefish. Burbot are also present. During investigations made in this drainage no native trout were found. Aerial surveys have established the presence of king and red salmon in Spring Creek and small, unnamed streams near the Gakona Glacier; however, no more than five salmon have been counted in the system during any individual survey.

Construction of a pipeline in this drainage would cause considerably less environmental and fishery resource damage than one constructed within the Gulkana River drainage. If the pipeline route followed the Gakona River drainage, the distance would be approximately the same as the Gulkana River route.

Mitigation of Fish and Fish Habitat Losses

During 1972, a total of 20 state, federal, and private construction projects involving possible fish and fish habitat losses were investigated and recommendations were made to mitigate these losses.

Contributions were made to the preparation of impact statements concerning the Chitina-McCarthy road, the Copper River Highway, the Glenn and Richardson highways, and on the Chitina River and Copper River Wild and Scenic Rivers proposals.

Periodic inspections were made of several construction projects including ones at the Nelchina River, Indian River, and the Robe River.

Soil erosion near Tolsona Creek, due to poor highway design, was inspected and recommendations made to protect the stream.

During 1972 there were no recorded fish losses due to construction; however, some minor environmental losses may have occurred during equipment crossings of certain streams.

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